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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,277	02/01/2002	Steven P. Cave	31305	4418

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EXAMINER

LAROSE, COLIN M

ART UNIT PAPER NUMBER

2623

DATE MAILED: 11/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/066,277	CAVE ET AL.	
	Examiner	Art Unit	
	Colin M. LaRose	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 6, 7, 8, 23-26, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 4,755,874 by Esrig et al. ("Esrig").

Regarding claims 1 and 23, Esrig discloses a method/system (figure1) operable to substantially automatically perform an evaluation of a sample of a material according to an established standard, wherein the system comprises:

a microscope (11) operable to magnify the sample;

a light source (29) operable to illuminate the sample, wherein the illumination is provided at a grazing angle so as to enhance surface contrast of the sample;

a stage (9) associated with the microscope and operable to move and position the sample under the microscope for viewing;

an image capturing mechanism (13) operable to capture an image of the sample through the microscope; and

a computing device ("image computer") operable to control magnification by the microscope, control illumination by the light source, receive images from the image capturing device, control movement of the stage, and store and execute a computer program operable to

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substantially automatically conduct an analysis (see e.g. figures 4 and 5) of the image and to generate a report setting forth a result of the analysis.

Regarding claims 2 and 24, Esrig discloses the analysis includes identification and measurement of one or more components of the sample (see figures 4 and 5).

Regarding claims 3 and 25, Esrig discloses the analysis includes identification and measurement of one or more physical features of the sample (see figures 4 and 5).

Regarding claims 4 and 26, Esrig discloses the sample is prepared prior to being magnified by the microscope, wherein such preparation facilitates the analysis (e.g. the sample is properly positioned on the stage).

Regarding claim 6, Esrig discloses the image capturing mechanism is a CCD camera (see column 4, lines 63-68).

Regarding claims 7 and 28, Esrig discloses the stage is a high-precision two-dimensional stage controlled by the computing device to avoid overlapping fields-of-view (column 4, lines 51-54: the stage 9 moves the module 23 so the objects under inspection are completely within the view of the camera 13 and there is no overlap between the field-of-view of the camera and that of the objects).

Regarding claim 8, Esrig discloses the computer program provides a graphical user interface operable to facilitate a user setting up and initiating the analysis, and to facilitate the user causing the report to be generated (monitor 15 provides a GUI).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 5 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Esrig in view of U.S. Patent 5,262,967 by Jaber et al. ("Jaber").

6. Claims 17 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Esrig in view of Wallack and Mitsuyama, and further in view of U.S. Patent 5,262,967 by Jaber et al. ("Jaber").

Regarding claims 5, 17, 27, and 37, Esrig does not disclose that the material is concrete and the sample is prepared in accordance with the established standard prior to being magnified by the microscope, wherein such preparation includes polishing a face of the sample, and the analysis includes identifying and measuring a number of voids in the sample.

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Jaber discloses a system for inspecting an image of a sample of concrete. In particular, Jaber discloses washing, scrubbing, polishing, etc. the sample of concrete (column 3, lines 36-42) and then identifying and measuring a number of voids in the sample (see column 2, lines 32-49).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Esrig by Jaber to inspect concrete as claimed, since Jaber discloses that it is conventional to inspect concrete for quality control purposes.

7. Claims 9-11, 14-16, 18-20, 29-31, 34-36, 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Esrig in view of U. S Patent 6,748,110 by Wallack and U.S. Patent 5,768,412 by Mitsuyama.

Regarding claims 9, 29, 14, and 34, Esrig discloses the method/system of claim 1, wherein the computer program performs a number of different image analysis techniques on the image, including—

a intensity profile segmentation and recognition technique operable to identify a unique characteristic of a profile of the object (figure 4 illustrates an intensity profile that identifies unique characteristics of the object).

Esrig does not appear to disclose a color segmentation and recognition technique operable to facilitate identification and classification of an object in the image, and to differentiate the object from other objects in the image; and

a shape feature segmentation and analysis technique operable to extract the object from the image and to characterize a shape of the object.

Wallack discloses a system for extracting objects from an image of a sample to be inspected. In particular, Wallack discloses performing a segmentation and recognition technique (figure 2) that identifies, classifies, and differentiates objects in the image, as well as characterizing their shapes. For example, figure 3 shows a “blob” of image data being extracted from the sample. The blob is segmented from the rest of the sample and its shape, among other things, is ascertained (see column 4, lines 45-49; column 10, lines 6-20).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Esrig by Wallack to provide a segmentation and recognition technique and a shape feature segmentation and analysis technique, since Wallack shows that such techniques are advantageous for identifying and characterizing objects in samples under inspection and provides more data with which to inspect the samples.

Wallack does not expressly disclose that the segmentation is “color” segmentation. Wallack appears to process greyscale images. However, at the time the invention was made, Mitsuyama shows that it was well-known and obvious to those skilled in the art that region segmentation is applicable to color images, such as those containing separate red, green, and blue signals, and segmentation is advantageously effected on the basis of color.

Regarding claims 10, 30, 19, and 39, Mitsuyama discloses color segmentation and recognition technique is based on RGB (see column 4, lines 55-67).

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Regarding claims 11, 31, 20, and 40, Wallack discloses the segmentation and recognition technique uses a nearest neighbor technique to identify and classify the object (column 8, lines 22-40: the nearest neighbors of an object pixel are examine to identify and classify a blob).

Regarding claims 15 and 35, Esrig discloses the analysis includes identification and measurement of one or more components of the sample (see figures 4 and 5).

Regarding claims 16 and 36, Esrig discloses the analysis includes identification and measurement of one or more physical features of the sample (see figures 4 and 5).

Regarding claim 38, Esrig discloses the stage is a high-precision two-dimensional stage controlled by the computing device to avoid overlapping fields-of-view (column 4, lines 51-54: the stage 9 moves the module 23 so the objects under inspection are completely within the view of the camera 13 and there is no overlap between the field-of-view of the camera and that of the objects).

Regarding claim 18, Esrig discloses the computer program provides a graphical user interface operable to facilitate a user setting up and initiating the analysis, and to facilitate the user causing the report to be generated (monitor 15 provides a GUI).

8. Claims 12, 21, 32, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Esrig in view of Wallack and Mitsuyama, and further in view of U.S. Patent 6,151,408 by Oosawa.

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Regarding claims 12, 32, 21, and 41, Esrig, Wallack, and Mitsuyama are silent to the color segmentation and recognition technique using a neural network and an associated rulebase to identify and classify the object.

Oosawa discloses a method for separating a region from a color image. In particular, Oosawa discloses segmenting a color region from an image utilizing a neural network and its associated rulebase (step 3, figure 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Esrig, Wallack, and Mitsuyama by Oosawa to utilize a neural network and associated rulebase to identify and classify an object, as claimed, since Oosawa teaches that it is conventional to identify and classify color regions in an image using neural networks.

9. Claims 13, 22, 33, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Esrig in view of Wallack and Mitsuyama, and further in view of "Feature Extraction using Fuzzy Relations for Objects of Various Shapes" by Cho et al. ("Cho").

Regarding claims 13, 33, 22, and 42, Wallack discloses the object is a void and the shape feature segmentation and analysis technique is operable to extract the void from the image and to characterize the shape of the void by correlating a bright area of the void with a dark region of the void (see figure 3 of Wallack – showing that a void is extracted by examining the bright and dark regions of and around the void), and Esrig teaches that the bright area and the dark region are enhanced by the grazing angle of the illumination (see figure 11 of Esrig – showing that the illumination 29 impinges light on the sample at a grazing angle, thereby enhancing the light and dark regions).

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Wallack does not disclose that the shape of the void is extracted from the image using a fuzzy logic correlator, as claimed.

Cho discloses an object recognition system that identifies the shapes of objects in an image using fuzzy logic (see Abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Esrig, Wallack, and Mitsuyama by Cho to characterize the shape of the void using fuzzy logic, as claimed, since Cho shows that it is conventional to utilize fuzzy logic to characterize an object's shape and utilizing fuzzy logic in this manner increases the performance of an object recognition system (see Abstract).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colin M. LaRose whose telephone number is (703) 306-3489. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au, can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2600 Customer Service Office whose telephone number is (703) 306-0377.

CML

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19 November 2004



VIKKRAM BALI
PRIMARY EXAMINER